

not reach to the anterior ocellus, nor are any black dots left at the sides of the eyes.

♀.—Length about $4\frac{1}{2}$ mm.

Bright but light yellow; mandibles tipped with rufous; head yellow except a broad area from the vertex, a little in front of anterior ocellus, to the occiput, which is dark green and granular; cheeks yellow, the dark area not extending downwards; antennæ yellow, a dark dot on second joint above; thorax dark above, but yellow at sides and beneath, except a dark mark just below wings; prothorax above with a broad yellow margin; nervures and margin of stigma fuscous, third discoidal cell absent; marginal cell broadly but obliquely truncate; legs yellow, hind tibiæ with a faint dark shade above. Abdomen yellow with apex a little reddened; first segment black with two more or less triangular yellow marks, and sides yellow; four straight black bands, not reaching lateral margins, the first three broad; venter yellow, rufescent apically.

♂.—Length $3\frac{3}{4}$ –4 mm.

In general similar to the female, but dark colour extending a short distance down cheeks, leaving a narrow yellow line next to the eye; flagellum, except last joint, fuscous above; sides of thorax dark, but pleura with a very large yellow patch anteriorly; hind tibiæ and tarsi behind, and a spot at apex of their femora, dark brown; apical part of abdomen orange or brownish yellow, without bands; there are four well-formed bands.

Hab. Alamogordo, New Mexico, at flowers of *Dasyllirion Wheeleri*, Watson, June 6 to 9, very many specimens (*H. L. Viereck*).

University of Colorado,
Boulder, Colorado, U.S.A.,
April 20, 1907.

BIBLIOGRAPHICAL NOTICES.

The Crawfishes of the State of Pennsylvania. By Dr. A. E. ORTMANN. *Memoirs of the Carnegie Museum, Pittsburg, Pa.*, vol. ii. no. 10, pp. 343–523, 7 plates: December, 1906.

SINCE Huxley, in a well-known paper, first placed the classification of the Crayfishes on a morphological basis and showed the interest attaching to their geographical distribution, much attention has been given to this group of Crustacea. In particular, the very numerous species occurring in North America have been the subject of important memoirs by Faxon and others. Dr. A. E. Ortmann, who is well-known as an authority on the higher Crustacea, has produced, in the memoir under review, a study of the Crayfishes of

Pennsylvania which deserves attention, not only from Carcinologists but from all who are interested in the wider problems of zoology.

In the first part of the memoir the author discusses the systematic characters of the forms found within the limits of the State. Seven species and one variety are recognized, and their variations are set forth in great detail. Dr. Ortmann's conclusions as to the limits of the species are not to be lightly disputed, were it only on account of the vast amount of material—between two and three thousand specimens—at his disposal. Further, his familiarity with the living animals—most of the material was collected by himself—gives him a great advantage over the mere museum species-maker.

The next section deals at length with the oecology and distribution of the various species. Especially interesting are the details given of the habits of the "chimney-builders"—the burrowing species which are so called from the chimney-like piles of mud thrown up at the mouths of their burrows. These species are found often at considerable distances from open water, burrowing down to reach the ground-water, and their chimneys are sometimes so numerous as to "hamper farming operations by interfering with the harvesting machines, clogging and ruining them"; elsewhere they were observed "coming up even between the railroad ties of the Morgantown and Kingwood Railroad." The distribution of the species within the State is illustrated by coloured maps, and it is shown that many of the facts cannot be correlated with the existing physio-graphical conditions. An explanation is sought in past changes in the configuration of the country and especially of the river-systems. How far the author's speculations as to the pre- and post-glacial migrations of the various species are justified is a question which can only be answered by local research, but they are certainly suggestive and stimulating.

The life-histories form the subject of the following section, and remarkable differences are shown to exist between the species in this respect. Two main types of life-history are distinguished, a "warm water" type characteristic of the species found in the larger rivers, and a "cool water" type shown by the species found in mountain-streams. In the former a definite seasonal cycle is observed, mating taking place in the autumn and spawning in the spring, while the cool water species breed at all seasons of the year. Some details are also given of the remarkable alternation of breeding and non-breeding phases which, as Faxon discovered, gives rise to the so-called "dimorphism" of the males in the American Crayfishes. A similar phenomenon has recently been described by Mr. G. Smith in certain crabs and may possibly be found to occur in other Crustacea.

After a short section dealing with the economic aspects of the Crayfishes, the memoir concludes with a discussion of some current theories of evolution in the light of the facts set forth. Many of the points touched on are of a highly controversial nature, and the arguments cannot be summarized here. It may be said, however, that Dr. Ortmann sees no evidence of "mutation" in the origin of species (and here, we believe, many systematic zoologists will agree

with him), but concludes that "Isolation or Habitudinal Segregation, as the factor forming species, is clearly seen in every case discussed."

It is, perhaps, to be regretted that Dr. Ortmann has seen fit to use the term "Crawfish" as the "proper American name" of the animals he deals with. It is surely pushing the rule of priority to an absurdity to apply it in such a case. Apart from this trivial matter, however, the memoir is one upon which the author and the Museum with which he is connected are to be congratulated.

W. T. C.

A Natural History of the British Butterflies, their World-wide Variation and Geographical Distribution. A Textbook for Students and Collectors. By J. W. TUTT, F.E.S. Vol. I. London, 1905-1906. 8vo. Pp. iv, 479; pls. xx.

WE have here another of Mr. Tutt's enormously detailed and elaborate volumes on British Lepidoptera, which, he tells us, was issued in parts and should form vol. viii. of the whole series. The introductory chapters (Part I. Chapters i.-xiv.) are devoted to general observations on butterflies; egg-laying, eggs, and larvæ; and probably the most interesting will be found to be those on the association of Ants with Butterfly Larvæ, and on the Carnivorous Habits of Butterfly Larvæ, wherein the Author brings together a large amount of scattered information which it is most useful to have epitomized. Part II. contains a detailed account of the ten British species of Urbicolides and Ruralides (Skippers and Coppers), and the work closes with an index of eighteen closely printed pages in double columns. The twenty plates represent eggs, larval hairs, perfect insects, &c., and one plate represents an apparatus for photographing the eggs of butterflies. The chapters on Obtaining Eggs of Butterflies and on Collecting Butterfly Larvæ will be found very useful and interesting to those lepidopterists who care to undertake such work. It will probably take two hundred similar volumes to complete the history of the British Lepidoptera on the grand scale projected by Mr. Tutt, yet all praise is due to him for his undertaking the initiative in such a gigantic task, and for having made an appreciable, if comparatively small, diminution in the number of volumes required for its completion, though this would require several lifetimes, unless a numerous band of entomologists were to devote themselves to separate portions of the task simultaneously.

Of the butterflies described in the present volume, *Chrysophanus dispar* is probably the most interesting. Mr. Tutt devotes forty-eight pages to this species; but a very large volume might be written on the subject, and the notice appears to us to be somewhat less complete than that of some of the other species which he discusses.

We need hardly say that Mr. Tutt's volumes on British Lepidoptera form an indispensable mine of wealth to all future lepidopterists who attempt to take up the study of butterflies seriously.

W. F. K.